**National Park Service**  National Park Service
U.S. Department of the Interior

**Northeast Coastal And Barrier Network
Inventory And Monitoring Program**

**Standard Operating Procedure**

**Converting the
NCBN Database Template**

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*DRAFT*

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## I. Introduction to the Database Template

The Inventory and Monitoring Program Database Template has been designed as a template for any Monitoring protocol in each of the I&M networks. This document provides explicit instructions on how to make changes to this template to adapt it to other monitoring protocols and networks. These instructions expect familiarity with developing tables, forms, queries and reports, with understanding object properties and events.
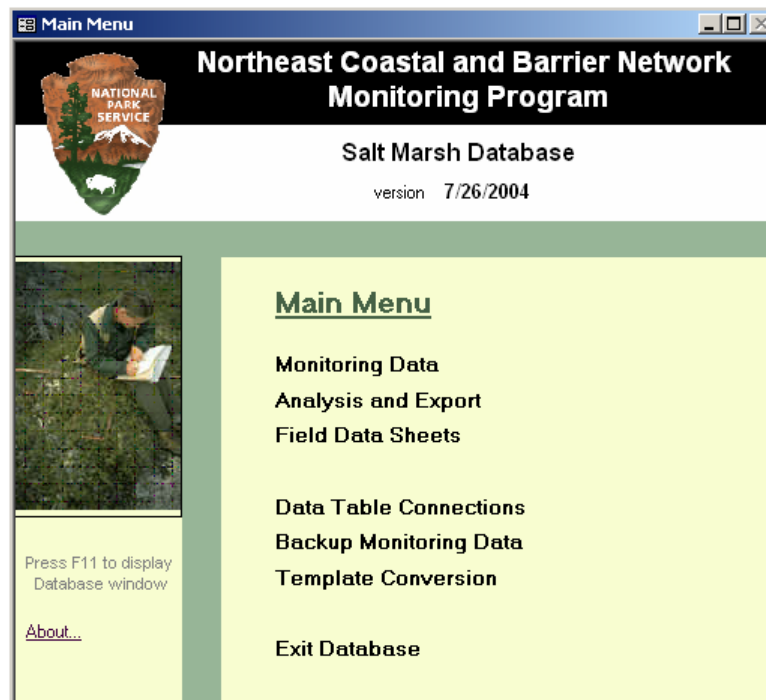


**Summary of the Template Utilities**

The Monitoring Database Template provides a basic design, the look-and-feel as well as several general utilities. The Template includes common data tables that are of use to all monitoring projects, such as look-up tables, personnel information, locations, and events. Since monitoring projects will differ widely depending on the network and protocol, tables for the specific data collected, beyond date, location, and personnel, could not be provided. Each network will need to incorporate these individually. The Template does provide several forms into which the monitoring data can be incorporated.

The Template is based on the Northeast Coastal and Barrier Network salt marsh monitoring project. The Template includes the salt marsh monitoring data tables, forms, queries and reports so that the Template is a complete and functioning database with example data and utilities. During the conversion process, database managers will add new data tables, etc. relevant to their monitoring protocol and then remove those specific to salt marsh monitoring.
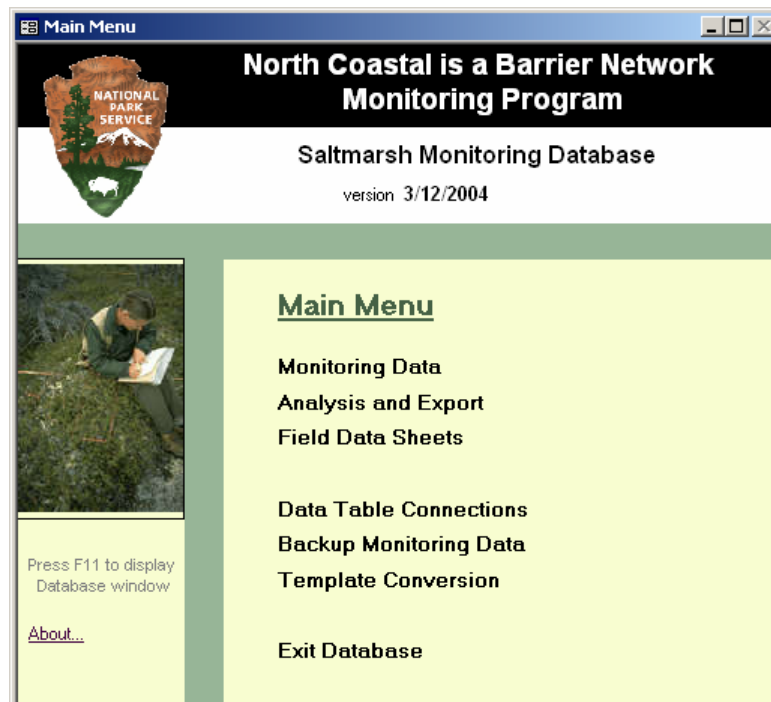
The Template includes:

- Menu forms for navigating to forms and utilities, based on Access's Switchboard Manager
- Standardized tables for events, locations, sites, personnel, image linking;
- Forms for monitoring events, locations, and photos, that includes room for sliding in protocol-specific subforms
- Lookup tables for parks, networks, species, and environmental conditions;
- Forms for adding and editing the data in the lookup and standardized tables
- Exporting data in tables and queries to Excel
- Printing summary reports
- Printing field data sheets
- Automatically refreshing linked tables
- Backing up monitoring data
- Wizard-like forms that make it easy to convert the Template to a specific monitoring project database

**The Template File Structure**

The database template is a combination of three database files: a front-end and two back-ends. Appendix I: Data Tables, includes a graphic of the table relationships, as well as a brief description of the role of each table included in the three database files.

The front-end file, **MonitoringSM.mdb**, includes all of the forms, queries and coding for entering, manipulating and retrieving the monitoring data. This file is the one that users will open. Although they may update the connections to the back-end files, they will not be opening them directly.

The first back-end file **MonitoringNER_be.mdb** contains tables common to most monitoring projects within a region or network, and is referred to as the Common Lists file. These tables are stored together so that they can be shared and updated across projects. For instance, a comprehensive species list is included, so that researchers use the same species names and TSN. A list of habitat types helps researchers to use the same text and abbreviations so that "saltmarsh" and "salt marsh" and "tidal marsh" are not considered three different habitats. Lists of park names, networks, wind and rain codes, compass directions, etc. are all include in the Common Lists file. Since this database consists of lookup tables, there are no relations between the tables within the file. There are relations, however between these and the data tables incorporated into the database front-end.

The second back-end file, **MonitoringSM_be.mdb** contains the actual monitoring data. The front-end contains links to the back-end tables, and as users update their monitoring data from the front-end file, the data changes are reflected in the back-end file. As you create your own data tables, specific for your monitoring protocol, you will develop them in this back-end, and then update the links to the front-end. Each time you open the database, it asks if you would like to save a copy of the data as a backup. It does this by making a dated copy of the data back-end file.

The table naming convention uses tbl_* for all data tables, and tlu_* for all lookup tables. If a table is used primarily for database management or for template conversion it starts with tbl_MDT_* (e.g., tbl_MDT_Conversion) for monitoring database template. Tables that contain specific monitoring data begin with tbl_SM_* for salt marsh monitoring (e.g., tbl_SM_VegPlotCover). When developing new tables specific for a different monitoring protocol, follow this convention, but substitute your protocol abbreviation for the SM. As the last part of the template conversion, all tbl_SM_* tables are removed from the database. Data tables that contain monitoring data, but for which the table and table structure are common across monitoring protocols start with tbl_* (e.g., tbl_Events). These tables should not be removed, but the existing data replaced or augmented.

**Outline of Template Conversion Process**

To convert the Template requires a series of steps that convert the references, functionality and the basic data tables from those of the template salt marsh monitoring to your own monitoring protocols.

1. Data table connections
   Before converting the database, you will need to ensure that the front-end and the back-end data files are reconnected. Each time these files are moved or renamed, their connection is lost. You will need to name these files appropriately for your protocol and then reestablish the connections.

2. Database settings

By supplying basic information about the new database, this step updates titling, graphics, dates, and default protocols, and other properties of the new database.

3. Protocol-specific data tables, forms, queries, and reports

The database template incorporates tables, forms and utilities that are common across monitoring protocols. Each monitoring project, however, collects unique information that cannot be predicted within a common template. The data collected for salt marsh vegetation will be very different than the data collected for bird monitoring or air quality. Each database manager for their monitoring projects must create these tables independently. The forms, reports and queries that run off these tables, must also be created independently.

The template includes example data entry forms that can be used as models for new entry forms. These forms have been designed with tabs to allow for salt marsh monitoring subforms to be removed and replaced with subforms specific to the new monitoring data.

4. Store linked tables information

Once the new data tables are available, the links between the front-end and these tables in the back-end database must be updated. By explicitly listing all linked tables and their back-end sources, the template can then automate their update each time the new database files are moved.

5. Printing and exporting data

The template utilities include menus for viewing reports that summarize the data, for exporting data to excel format, and for printing field data sheets. These utilities use tables, queries and reports as sources. These, like the protocol-specific data tables must be constructed for each new database. Once they have been created, this step adds them as menus options in the template.

6. Cleaning out the old data

The final step in conversion is to clean out old database objects. Once all of the new data tables, queries, forms and reports have been added, the old database objects specific to salt marsh monitoring in the template need to be removed.

## II. Initial File and Protocol Setup

The Database Template includes three database files. Before you can begin converting the template or editing the database files, you will need to make a copy these files and update the links that connect them together.

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**Note:** The main database window is hidden when the database first opens. This is to prevent users from accidentally (or advertently) making unwanted changes to the database. Also, it protects from accidentally closing the database, since closing the database window closes the database itself. To use the database window go to *Unhide* under the *Window* menu, and select the database window.

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### Copy the database files

1.  Copy the three files: MonitoringSM.mdb, MonitoringSM_be.mdb, and MonitoringNER_be.mdb into an appropriate directory of your choice.

### Select a protocol code

2.  Select a code for the protocol you are using, preferably a two-letter abbreviation of the protocol. The database uses this as a Protocol ID in creating the EventIDs, in file naming, and in other areas. For example, the Database Template uses "SM" for the Northeast Coastal and Barrier Network Salt Marsh protocol. Use a code that will not be confused with other protocol codes in your network or region. If you plan to share data with other networks using the same protocol, it can be helpful to use the same ID, but it is not necessary.

### Rename the database files

3.  Rename MonitoringSM.mdb and MonitoringSM_be.mdb by replacing "SM" with the two-letter protocol code you selected above.

4.  Rename the Common Lists database file
The MonitoringNER_be.mdb file contains tables common to most monitoring projects within a region or network.

a)  Decide if you will be maintaining these common tables at the regional or network level. Select a two to four letter code for your region or network.

b)  Rename MonitoringNER_be.mdb by replacing the "NER" for the Northeast Region with the code for your region or network you selected above.

### III. Update Links to Backend Tables

Now that you have copied the database files and renamed them, you must update the file names and reestablish the links from the front-end database file (MonitoringSM.mdb) to the tables in the two, backend database files (MonitoringSM_be.mdb and MonitoringNER_be.mdb). These instructions will use these filenames, although your own files are now named differently. Substitute your file name as appropriate.

Access can include tables in two ways. First, the table data and structure are included directly in the database file. Alternatively, the tables can be included as links to tables in another database file, storing the actual data and structure in a back-end database file, and storing a reference to the backend table in the front end. To the average user, they appear the same. If the backend database file is moved, the table reference in the primary database becomes invalid and the data is no longer available until the reference information for the link is refreshed.

You need to update the references to linked tables in Monitoring Data and the Common Lists backend database files. Each time you move or rename the files, it is important to update the connections again.

**Begin the Template Conversion series**

The Template Conversion form walks you through the main steps of converting the template.

> **Note:** You do not have to complete all conversion steps before closing this form. You can choose to convert the template a little at a time or you can do it all at once. If the database needs updating later, e.g., you add more backend tables, or you have new reports to display, you can go directly to the appropriate step in the conversion process, and make the necessary changes.

1. At the Main Menu select Template Conversion.

2. Review Step 1: Data Table Connections

3. Click the *Update Table Connections* button associated with Step 1. This option is also available under the Main Menu, for users who are moving or sharing files, but are not performing the conversion. It is included in the *Template Conversion* form to remind database managers to perform this step before continuing with the conversion process.

**Update Table Connections**

The *Database Management: Update Links to Backend Tables* form lets you browse to the two back-end files and update their file names and locations. The form then refreshes the links using the new information.

> 4. Update the filename for the Common Lists backend. Click the browse button associated with the Common Lists file, and select the new location and filename of your common lists file, which you renamed from MonitoringNER_be.mdb.

> 5. Update the filename for the Monitoring Data backend. Click the browse button associated with the Monitoring Data file, and select the new location and filename of your monitoring data file which you renamed from MonitoringSM_be.mdb.

> 6. When your new files are displaying correctly in the *Link File* textboxes, click *Update Links* to update the template with your new database files.

## IV. Database Settings

The Database Template stores information about your network, protocol, and EventID to use as prompts and labels for the users. You must next update this information to correctly reflect your network and protocol.

**Begin Step 2 of the Template Conversion**

1. If the Database Template Conversion form is not currently displayed, select Template Conversion from the Main Menu.

**2.** Review Step 2: Database Settings

**3.** Click the *Update Database Settings* button associated with Step 2. **Enter new values for each of the database settings**



1. Select your name for Converted By from the drop-down list of personnel. If your name is not available, click *Add New Personnel* and add yourself to the list of personnel associated with this monitoring database. You will need to click the *Refresh Lists* button at the bottom of the form for any new names to appear in the drop-down list.

2. Select your network name from the pull-down list.

3. Check that you are using the same network acronym as listed. If these do not agree, you will need to edit the tlu_Networks table in the Common Lists database. You cannot change the value directly on this form.

4. Enter the name of your protocol. This will be used on the Main Menu. If your protocol is not available, click *Add New Protocol* to add your protocol to the list. After you add (or delete) protocols, you will need to click the *Refresh Lists* button at the bottom of the form for the changes to appear in the protocol drop-down list. Check the code and description of your protocol. If they are not correct, you will need to edit them in the table tlu_Protocols. You can click on *Add New Protocol* to edit the table.

5. Select whether you would like the Start Time of sampling events to be included in the EventID. If you do not need to distinguish between sampling events at the same location on the same day, there is no need to include start time. If, however, you might return to the same location more than once on a give day and collect unique data, you will need to include time so that you will have unique EventIDs.

If you do not include time, the EventID will look something like: COLO_BR_P10_SMN_06/18/2003. If you do include time, the EventID will look more like: COLO_BR_P10_SMN_06/18/2003_13:21:00.

6. Specify whether users can edit the EventIDs. Under most conditions, this should be set to "No". Once a user has entered an event and created an EventID, it is unlikely that you would want this data to be changed. If you do allow the changes, an unfortunate (and likely common) consequence is that users will inadvertently begin to enter new data on top of the old data, editing the first record in the table, thinking they are adding a new record. The Template does provide some warnings, but the safest course is to prevent any EventIDs from being changed.

7. Enter the path and filename of an image you would like included on the Main Menu. You can either enter the path and filename directly, or use the *Browse* button to locate it. It is nice to include an image reflecting your local environment and researchers.

**Update the database settings**

8. Click *Update Settings* to incorporate these new settings into your database.

**V. Creating Your Own Tables and Queries**

The Database Template includes data tables and queries specific to the Northeast Coastal and Barrier Network salt marsh monitoring protocol. You will need to create your own data tables to store and organize the data collected under your protocol. Be sure to put them into the backend files.

Although this SOP provides no wizards for making your tables and queries, it is a fundamentally important step. Following the guidelines below will help ensure that your data to will work its best within the Monitoring Template framework.

Don't forget to unhide the database window if you haven't already. Go to *Unhide* under the *Window* menu item, and select the database window.

**Table and Query Guidelines:**

1. Placement

a)   All data tables should be developed in the Monitoring Data database, MonitoringSM_be.mdb. Do not create your own blank database and try to connect it later. Add your tables directly into the template databases and remove unnecessary objects as the last step of conversion.

b)   All common lookup tables should be developed in the Common Lists database, MonitoringNER_be.mdb

c)   All tables should then be linked into the primary database file, MonitoringSM.mdb, using the File / Get External Data / Link Tables menu option.

d)   Queries are developed within the primary database file, MonitoringSM.mdb.

   2.   Naming Conventions

a)   Begin data table names with "tbl_*",

b)   Begin common lookup tables with "tlu_*". These should be stored in the Common Lists database

c)   Tables beginning with "tbl_MDT_*" are specific to maintaining the template settings and conversion process. Do not use this prefix for other tables.

d)   Begin queries with "qry_*"

e)   Begin analytical queries with "qry_Analysis_*"

f)   Begin data queries with "qry_SM_*, substituting your protocol code for "SM"

g)   Begin queries used for the primary data forms with "qry_Events_*"

   3.   Primary Key

a)   Wherever possible and appropriate, use the EventID as the primary key. It is currently a 50-character text field.

   4.   Table Relationships

a)   Update the relationships between tables in all database files.

b)   Referential Integrity – be sure to include cascades from tbl_Events to your data tables, to allow adding and deleting monitoring data from the main data entry forms. By including cascading additions and deletions, you can add or delete a specific event in your monitoring form, and it will add or delete the appropriate records from the related tables displayed in your subforms.

   5.   Table and Query Descriptions

a) Although not necessary, it is helpful to include descriptive information about the role of each table or query. In the primary database file, MonitoringSM.mdb, in the database window, right-click on the object name to bring up the Properties box and type in a description or role for each table and query.

## VI. Add New Linked Tables

The Database Template stores information about all tables linked to the Monitoring Data and Common Lists database files. As you convert the Template you will need to link to all of your own monitoring data as well as any new lists for your network or region. These tables should be stored in the backend databases, and linked to the main front-end.

**Create tables and queries**

The previous section of this document discussed creating new tables. Any time you create new data tables, they should be stored in the monitoring data backend database. Any time you create new lookup tables, they should be stored in the Common Lists backend database.

You have already seen how to browse to the new locations for the back-end files and refresh the links when the files have been moved. To refresh the links of any new linked tables you have added, such as all of your monitoring data, you must list these links in the Template's lookup table. In addition, if you remove any linked tables, such as example salt marsh monitoring data, that are not relevant to your database, the Template should not attempt to refresh these. Now that you have added in many of your own data tables, it is time to update the list of links.

**Link to backend tables**

If you have not already done so, establish the Access link from the frontend database to the new tables in the backend databases.

1. Go to the Database Window. If it is hidden, select *Unhide* from the *Window* menu. Select the database window.

2. Select *Get External Data* from the *File* menu, then go to *Link Tables*.

3. Select the tables from one of the backend databases.

4. If you have tables to link to from both databases, link to tables in one using steps 2 and 3, then link to the tables in the other by repeating steps 2 and 3.

**Begin Step 4 of the Conversion**

5. If the *Database Template Conversion* form is not currently displayed, select *Template Conversion* from the *Main Menu*.

6. Review Step 4: Store Linked Tables Information

7. Click the *Update Linked Table Information* button associated with Step 4.



**Update information on table links**

The *Linked Tables* form shows the linked tables in your database, and to which backend database, if any, they are currently assigned. NOTE: this form does not read the actual Access link from the table itself, but assigns where the database should look for them if you move the files and need to refresh as you did in Section III. Update Links to Backend Tables, above.

8. Review the list of tables in the center list box: *Linked Tables still unassigned*.

9. Select all unassigned tables that should be linked to from the Common Lists database (MonitoringNER_be.mdb) and click < *Add to Common Lists* <.

10. Select all unassigned tables that should be linked to from the Monitoring Dataset database (MonitoringSM_be.mdb) and click > *Add to Monitoring Datasets* >.

11. There are several linked tables that will no longer be needed once you have completed your template conversion. Do not move them to unassigned at this time. Having template forms and reports as functioning examples may be very useful during your conversion process. After you have completed the development of your own database objects, you can return and clean out all unnecessary template objects.

12. When all linked tables are properly assigned, click *Done*.

## VII.    Primary Monitoring Data Forms

The Database Template includes forms for data entry, search and display that are adaptable to different protocols and networks. The main form includes the information about the monitoring event: e.g., where, when, and by whom. The protocol-specific information can be included as a subform maintaining the coding and the formatting of the database template.

Before creating your own forms and subforms for data entry and display, please review this entire section. This will ensure that your design is compatible with the Database Template. Place all forms and reports into the frontend database file.

**Protocol-specific data forms** [frm_Monitoring_Nekton, frm_Monitoring_Vegetation] Two prototype forms exist for sampling data. The form frm_Monitoring_Nekton, shows nekton sampling data; frm_Monitoring_Vegetation show the results of percent cover sampling.



**Make a new form for your data**

Copy either the form frm_Monitoring_Vegetation or frm_ Monitoring_Nekton to a new form named according to your data. The frm_ Monitoring_Nekton, includes a great deal of Northeast Region nekton protocol-specific background code, which would be carried along if you copied it. The frm_Monitoring_Vegetation does not have any vegetation-specific code. If you would like to include a *Sampling Photos* tab, however, you will need to copy the frm_Monitoring_Nekton,

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as it is not included with the vegetation. Name the new form frm_Monitoring_*, replacing either "Nekton" or "Vegetation" with an appropriate name for your monitoring protocol.

1.  Form Title

a)  In design view, change the label at the top of the form to reflect the name of your monitoring protocol.

b)  Change the form's Caption property to reflect the type of data sampled. This is the title on the form window, and is also used in the Windows task bar to identify the window.

2.  Record Source
The form runs off either tbl_Events, or a query using tbl_Events. The template example form uses qry_Events_SM_Vegetation and qry_Events_SM_Nekton. There are two main advantages of using a query. First, you can include additional fields for users to sort or filter on that are not displayed on the form. For instance, users can filter on Park, Site Name, or Year, although none of these fields are included in tbl_Events directly. Secondly, if you have more than one SOP or protocol combined in the database (you have more than one monitoring data form), using a query lets you select only relevant eventIDs. This is helpful for the eventID selector at the top, and for the filter/sort utility at the bottom. In the case of this template, there are two distinct salt marsh monitoring protocols: nekton and vegetation. The nekton sampling form does not include vegetation sampling events, and vice versa, the underlying queries use the protocol value to show only nekton or only vegetation events.

a)  If you choose to use a query and have not yet created it, do so now. You may want to review qry_Events which is included in the template. This query adds Station, Site Code, Site Name, Park Code and Year, based on the standardized tables (tbl_Locations, tbl_Sites) to the tbl_Events fields. These fields are useful in user sorts and filters.

b)  Reset the form's record source to match your chose of table or query.

3.  Monitoring Event Tab
The first tab, *Monitoring Event*, includes information for the event table – where, when, and by whom the data were collected, as well as when the who entered and last updated the data and when. This section may not change appreciably.

a)  Match your tbl_Events or input query
    If you have made changes to the tbl_Events, you may need to edit this tab to reflect your individual needs.

b)  Update the default Protocol
    Edit the default value property of the protocol combobox to match your protocol.

c)  Double check the Filter / Sort fields

The combobox listing available sort or filter fields for the form reads all fields from your record source (e.g., tbl_Events). Be sure that all fields have appeared. If you wish to alter this list, you can do so by using the combobox Row Source Type and Row Source properties. If you do not include any fields beyond those displayed on the form, you can choose to remove the sort/filter utility at the bottom, as the available tools on the Access toolbar will do sorts and filters off of all visible fields, anyway.

d) Add Locations button
To clarify, the Add Locations button only displays when you are adding a new event. If the event has already been added, then the location must have been as well. Users can access the Locations form for adding and editing locations directly through the Monitoring Data switchboard.

e) Monitoring Event caption
You can change the caption of the Monitoring Event tab by editing its caption property. Do not change its name property, however, as this is referred to by some of the VB code.

4. Protocol – Specific Tabs
You can include one or more tabs for the specific sampling data of this database. If the sampling occurs as separate events, they should be included as separate forms. If however, the data are collected as one event, but there some subsets of data, they should be included as separate tabs. The only advantage of more than one tab is to

prevent the form from becoming too busy.

In this template, the nekton sampling and the vegetation sampling use separate SOPs, occurring on separate days, potentially with separate field crews. The physical parameters and species collection of the nekton monitoring protocol, however, are part of one monitoring event. The data can easily be separated on two tabs to make the data easier to read and to fit on screen.

a) Create your own sampling data tables.
   If you have not already completed your tables, please return to the previous section on Creating your own data tables and queries.

b) Create your own sampling (sub)forms.
   These forms will be included on the protocol-specific tabs on the monitoring events form.

(1) Design your forms so that they display appropriately on the form. If you will be using more than one tab for you sampling data,



be sure to use different forms, so that one form can be included on one tab, and another form on the other tab.

(2) Do not include the Database Template formatting on these subforms, as this will add the green bars and the NPS logo to the subforms, but they are already included in the primary form.

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(3) The form frm_Monitoring_Nekton includes multiple subforms on two tabs, and a sampling photos tab, whereas the frm_Monitoing_Vegetation includes only one sampling tab with a very simple form. Review these as needed.

c) Incorporate your forms onto the tabs.
You can incorporate your own subforms using either of the two methods below:

(1) You can use the existing tabs, by deleting the subforms from the tabs, and resetting the tab's name and caption properties, then adding your subforms.

(2) Alternatively, you can delete the existing sampling tabs, add new ones, edit the caption and name properties, and add your subforms.

Once you have added a form as a subform (child) to another form (parent), you can edit the child form from the parent form. This is particularly helpful as you are trying to make the formatting match, and to correct any problems made apparent upon inclusion within the tabs.

d) Add your own code
You can add any additional code to the form that you like.



5. Sampling Photos Tab
This tab (available only the Nekton Monitoring form, not the Vegetation Monitoring form) allows the user to link to photos of the monitoring event. The database stores the location and filename, the form displays the photo.

a) If your protocol does not include photos, simply delete the tab or use the Vegetation Monitoring form as your base.

b) If your protocol does include photos, replace the template data with your own data. The tables tbl_EventPhotos, and tbl_PhotoPathNames store the information about the photo files and the folders containing photos. You can either edit the tables directly or use the form to clean out the old data and add your own. The template data did not include any photos, so only the first few records have photos associated with them (and they are not from the Northeast Coastal and Barrier Network, my apologies to all those in the Northeast).

## VIII.  Secondary Monitoring Data Forms

Several tables and forms serve as background information to the primary data entry forms. These include information on the monitoring locations and sites, the personnel responsible for monitoring and data entry, habitats, species, etc. These tables and forms have been developed to be generic for any monitoring project and template conversion does not require you to make any changes to the form or table design, although you will need to populate them with your own data. You may find, however, that your protocol or network has specific needs that are not addressed in the template. Edit these forms and tables as necessary for your project.

**Locations and Sites [frm_LocationsAndSites]**

This form lets the user edit or add new locations and sites. The locations are the exact point where a monitoring event takes place, it requires XY coordinates to define. A site is the more general area where the locations are found. A location will likely have a transect number or point number. A site will have a name, perhaps from a map. An example site maybe "Fred's Lake", and the locations A1, A2, A3, and A4 are points on the lake, in transect A, for instance, where water was sampled. Usually, a site will have several locations within it. A site can be a lake, wetland, named forest, a unit within a park, a town, a valley, etc.

1. Updating the Locations Tab *LocationID* is automatically calculated as the concatenation of the *SiteID* and the *StationID*. If you change this formula, you will need to edit the procedure *CreateLocationID*, which is called by the *OnExit* event of both the *SiteID* and the *StationID*.

a) *SiteID* is a lookup from the available sites. Add, edit, or delete sites from the *Sites* tab.

b) *StationID* is whatever naming convention is used by your monitoring protocol.

c) *Habitat* is included for user convenience and is not a required field. Add, edit, or delete habitats using the *Habitat* form (frm_Habitats) available from the Monitoring menu.

d) Coordinates can be in either Latitude and Longitude or in UTM coordinates. If a GPS is used, it is a good idea to include the estimated errors. Currently the database does not use the coordinates for any calculations, however, future databases may link directly to GIS.

e) *Comments* are not required, but may be useful for returning to a location in the future, or for storing information about how the coordinates were derived or anything peculiar about the location.

2.   Updating the Sites Tab

If you change the fields within tbl_Sites, you will need to update this form accordingly. If you do not change the sites, the text boxes should be fine.



a)  *Site Name* and *Site Code* are chosen by the monitoring researchers.

b)  *Park* is the NPS 4-letter code for the park.

c)  *SiteID* is automatically calculated as the concatenation of *Park* and *SiteCode*. If you change your definition of *SiteID*, you will need to edit the *CreateSiteID* procedure.

d)  *Description* is not required, but might be used for helpful information for returning to a site.

**Personnel** [frm_Personnel]

This form is for editing the list of personnel who perform field sampling and data entry verification. It is not anticipated that you will need to update this form.
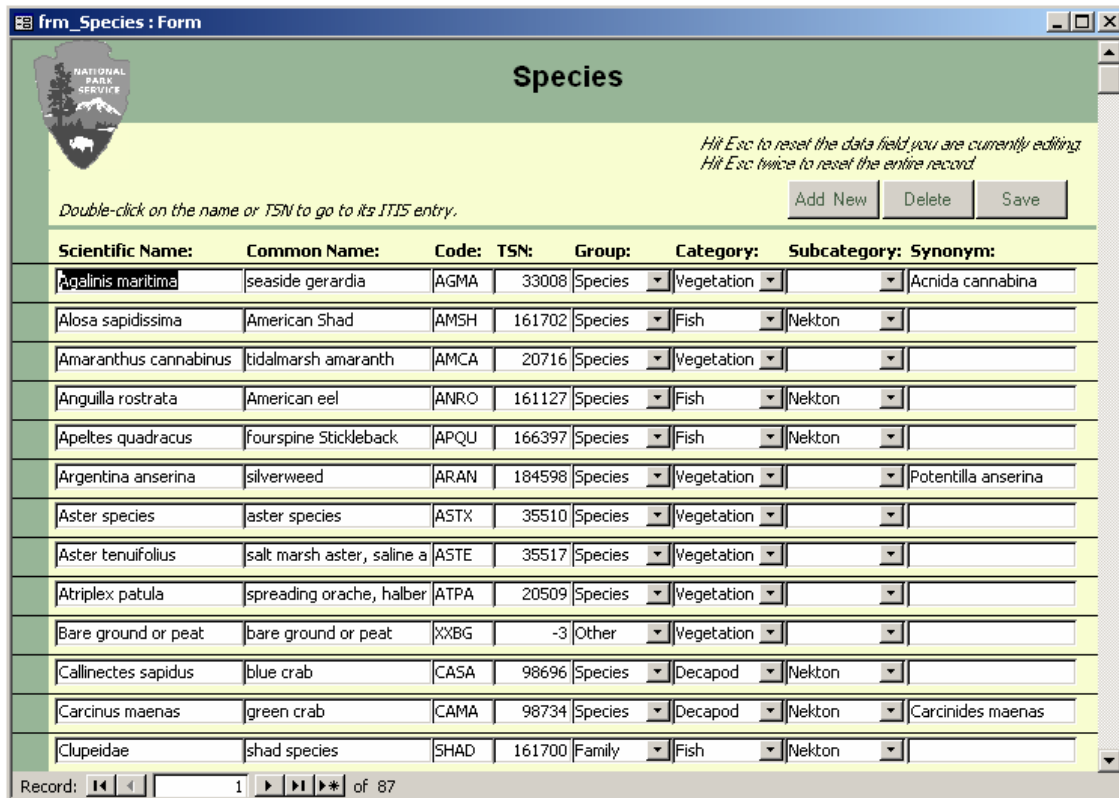
**Species** [frm_Species]

This form is for editing the list of known species. If you change the underlying tlu_Species table in the regional monitoring backend, you will need to reflect these changes on the frm_Species.

3.  The *Scientific Name* is the one considered the primary name within the ITIS database. Synonyms can be added to the *Synonyms* field for convenience of the user. The synonyms are not used by the database in any fashion.

4.   The *Common Name* is whatever is used by the researchers. This field is not used by the database directly, and is only included for user convenience. Common



names are displayed in some picklists, but are not bound to table data. If you would like to include more than one common name, separate them by commas.

5.   The species *Code* is also just for user convenience, it is simply the first two letters of the genus followed by the first two letters of the species. It is not currently being used in any way. It has been included, however, because some taxa and projects may have conventionally accepted codes. That could be used elsewhere.

6.   The *TSN* is the taxonomic species number for the species as determined by ITIS. This is the number used by the database to store species collection information in the monitoring tables. Be sure to use the primary TSN and not the TSN for a synonym for the species.

7.   *Group* is to help determine what level of specificity the record represents. Most records in the species table will be the taxonomic species. However, in other cases, field identification can only be made to the family or genus level. Use group to specify if the record is a species, genus, family, other (e.g., bare ground) or broad group (anything broader than family).
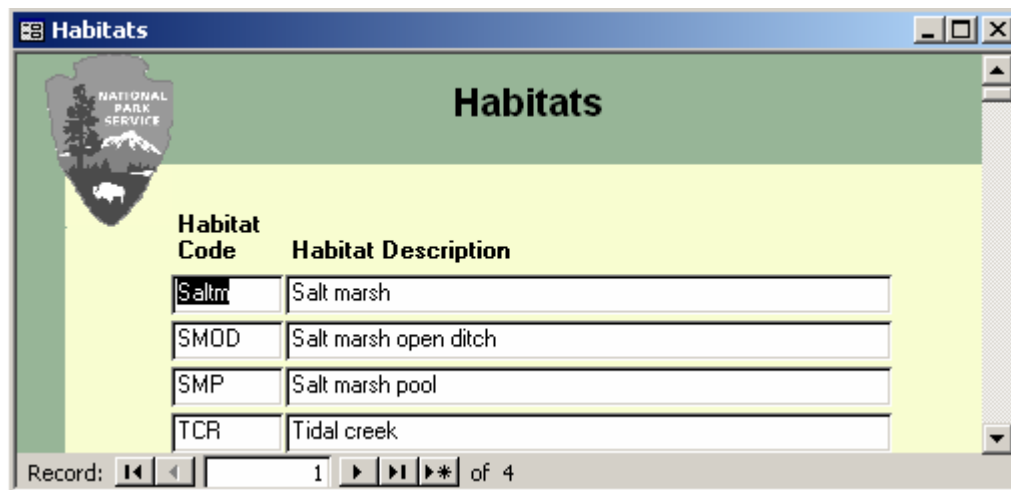
8.   *Category* and *Subcategory* are for selecting subsets of species for different protocols. They are used by the database for filtering tables, forms and drop-down lists. For instance, the Vegetation Monitoring form includes a combobox of

species to select from. This combobox is filtered from tlu_Species to include only vegetation not nekton.

The lookup for these fields is incorporated into the fields' definitions in table, tlu_Species, not in the form. To edit the list of available categories and subcategories, you will need to open the *Common Lists* database, and edit the table *tlu_Species*.

**Habitats** [frm_Habitats]

This form is for editing the descriptions of habitats. It is not anticipated that you will need to
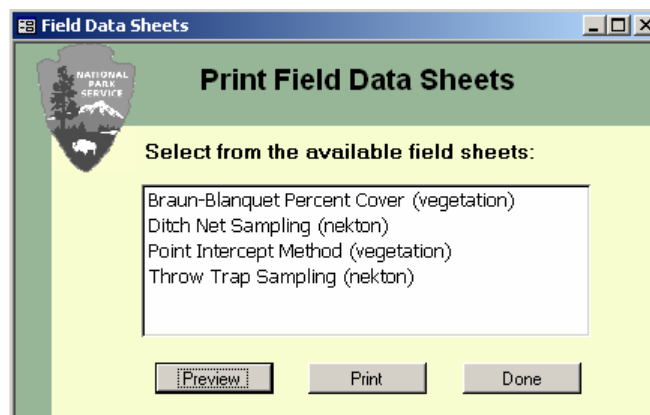


update this form.

## IX. Preparing Data for Export.

The Database Template provides the ability to view or print data reports and field data sheets, and to review or export to Excel tables raw data. While the coding for these tools is incorporated into the Template, the actual protocol-specific data, the forms, reports, queries and tables themselves are not. You need to decide what data you will be making available for export in which format before you can link these to the appropriate tool.

**Field Data Sheets**

The Database Template includes a utility to view or print copies of blank field data sheets – the paper forms filled in by researchers in the field. This is useful for two basic reasons. First, it is a convenient means to store copies of the sheets for future needs; researchers will always have blank copies available. Secondly, monitoring database are designed for longterm storage and analysis of field data. In the future, questions could arise during analysis that would require an understanding of how data were recorded in the field. The database provides a long-term record of the field sheets.

1. Obtain copies of all appropriate field data sheets.

2. For each field sheet: create a blank report in design view. Do not associate this report with any tables or queries. This is to remain a blank form.

3. Add labels, lines, rectangles, etc to mimic the field sheets. Alternatively, you can scan a sheet and include the graphic on the report form.

4. Save the report. The naming convention for these is "rpt_FieldSheet_Protocol_*", where Protocol is the short code for your monitoring protocol. For example, "rpt_FieldSheet_SM_PointIntercept" is the field sheet for the Point Intercept method of the Salt Marsh monitoring protocol.

5. Do not incorporate the Database Template formatting (NPS Logo and green borders) unless the sheets used by researchers in the field is to include this formatting.

6. Repeat steps 2 through 6 for all field sheets.

**Summary Reports**

These reports are helpful for showing monitoring data to NPS managers, resource scientists, and for researchers. Summary reports can include any of the relevant data in the database. By using queries on the primary data tables, you can include anything for raw numbers to in-depth calculations.

7.  Work with NPS staff, management and contractors to determine the types of summary reports most useful for your database.

8.  If appropriate, develop queries to sort, filter and perform calculations on the base data to suit the needs of your summary reports.

9.  Create a report that displays your summary data. We recommend using the Access report wizard. If you are not using the wizard, you can copy *rpt_I&MReportTemplate*, to a new name and add your report elements. If you use the report template, do not add the Template formatting with the conversion tools (steps 5 and 6, below).

10. Save the report. The naming convention for summary reports is "rpt_Analysis_Protocol_*", where Protocol is the short code for your monitoring protocol. For example, "rpt_Analysis_SM_NektonLengths" summaries the measured lengths of nekton collected using the Salt Marsh protocol.

11. Add Database Template formatting to your report (NPS logo and green bars).

> a) Select *Template Conversion* from the Main Menu.
>
> b) Select Step 3, and click Add Formatting to Forms and Reports button.
>
> c) Select the Report from the first drop-down list.
>
> d) Select the name of the report you have just created and click *Convert*.
>
> e) Enter a title for your report at the prompt.

12. Review the changes made to your report. If they are okay, save the report. If they have conflicted with existing formatting, close the report without saving. Open the form again, change the report as needed, and add the Template formatting again. If this does not work, you can open *rpt_Template* and copy the borders and NPS logo manually.

**Exporting Data to Excel**

Researchers often use statistical packages or Excel to perform further analysis on their data. This utility allows data in tables and queries to be exported to Excel format. Most statistical packages can read a *.xls file. Or further data conversion can be performed within Excel.

13. Work with researchers and managers to determine the data they need to use outside of Access. Determine the format for the data – the fields, the order of the fields, whether it should be transposed in some fashion, etc.

14. Create any queries necessary to present the data in the format necessary.

**Updating Export Lists**

The Database Template includes three utilities for exporting and printing data. Each utility (Print Field Data Sheets, Print Summary Reports, Export Data to Excel) has a form with a simple pick list for the user to select the data of interest, and then either a *Preview*, *Print* or *Export* button to see the data. The Database Template conversion form provides a convenient way to remove the original template options and to add your new options.

15. Select Template Conversion from the Main Menu.

16. Review Step 5: Printing and Exporting Data.

17. Click the Update Export Objects button.

18. On the *Export and Printing* form, select the export utility to start with. The utilities are: Summary Reports, Field Data Sheets, and Export Data to Excel.



19. Add your new options.

a) In a new row, select the object type: report, table, or query. Note, report is the only type available for the Summary Reports and the Field Data Sheets utilities. Table and query are the only types available for Export Data to Excel.

b) Select the name of the object to export. This is the actual name of the object in the database, e.g., "rpt_Analysis_SM_NektonCounts".

c) Enter a descriptive title for the export data. This is the text that appears in the list box that the user selects from.

20. Delete old template options. Any options from the original template that are no longer valid should be deleted. Place your cursor on any of the text boxes for that record, then select *Delete Record* from the Access *Edit* menu.

21. Repeat steps 4, 5 and 6 for all of your export options.

22. Click *Done* to return to the *Template Conversion* menu.

## X.  Changing the Switchboard and other Objects

**Changing the Main Menu**

You will need to alter the *Monitoring Data* menu of the Template switchboard to reflect your protocol-specific data forms. The other menu items were designed to be generic, so they can be consistent between monitoring protocols and networks.

The Switchboard was created using the built-in Switchboard Manager wizard. The Switchboard includes the Main Menu, the Monitoring Data, and the Data Analysis and Export menus.

1.  To open the Switchboard Manager, go to Tools – Database Utilities – Switchboard manager.
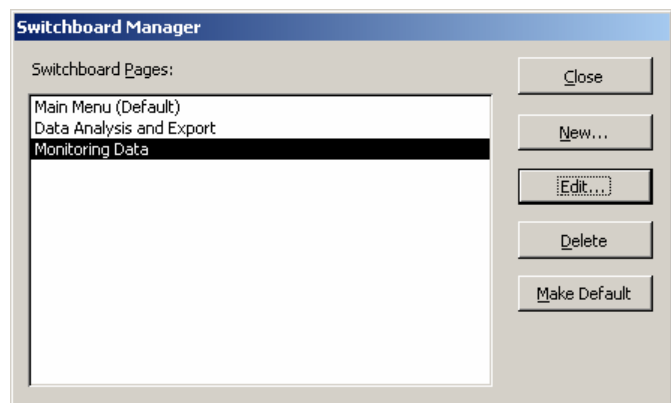
2.  Select the *Monitoring Data* switchboard item and click *Edit*.

3.  Use the wizard to make your changes. Use the Access help for further instructions on using the Switchboard Manager.

**CAUTION:** The NER template, includes blank lines as switchboard items to make the switchboard easier for users to read. They act as spacers between groups of items. Normally, if you add an item to a switchboard, you would select new, create the new item, then move it
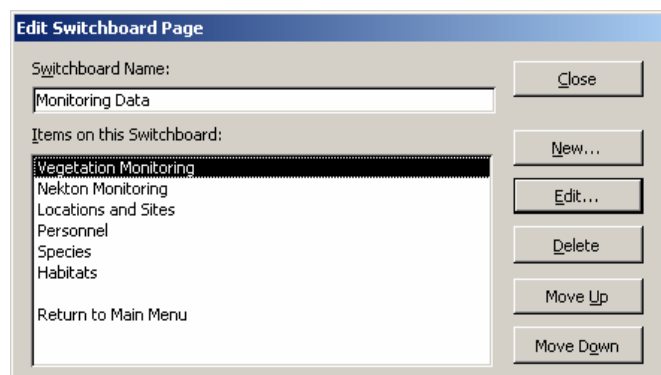
up to the correct position.  If you add a new switchboard item on a page that has these blank lines, you *cannot* move the item up! When the item reaches a blank line, it will be lost. Instead, you must go to the Switchboard Items table and change the item numbers manually.

To avoid problems using the Switchboard Manager caused by the inclusion of blank lines, you can use an alternate switchboard table that does not have blanks. To do this, rename the table *Switchboard Items* to *Switchboard Items Blank*. Rename *Switchboard Items NoBlanks* to *Switchboard Items*. You will need to close the Switchboard form, before you can rename these tables, however. To do so, change the Switchboard to design view, then close.

## XI. Clean out the Database

When you have completed all of the steps to adapt the NCBN Monitoring Database Template to your own monitoring database, you should remove extraneous tables, forms, queries and reports from the database.

**Backup your database files**

Just in case you accidentally delete the wrong object, backup all three of your database files.

1.  For each database, use the Windows operating system to make copies of each file.

**Clean out unnecessary forms and reports**

2.  Step through the names of each form and report. If a form or report is no longer necessary for your database, delete it.

3.  Return to the *Main Menu* and select the various Monitoring Data forms, Field Data Sheets, Summary Reports and Export to Excel options. Be sure that everything still works before you continue. If you have inadvertently deleted the wrong object, you can return to your backup, and start again.

**Clean out unnecessary queries**

4.  Step through the list of queries and delete any queries that are no longer necessary.

5.  Once again, step through your all of your forms and reports to be sure that you have not accidentally deleted a necessary object. You may find that some reports or forms are still looking to template queries, and require updating to consistently reflect your new queries.

**Clean out unnecessary linked tables**

6. Update the Template Linked Tables information

a) Return to the Linked Tables form, by clicking Update Linked Table Information under Step 4 of the Template Conversion form.

b) Review any links that are no longer needed, particularly those Monitoring Dataset links to the salt marsh data of the template. Select the table names in either the Common Lists box or the Monitoring Dataset box. Then click the appropriate *Remove from…*button. These tables will now show as unassigned. Repeat for both backend databases. Click *Done* to save your changes.

Examples tables you may want to remove include: tbl_SM_DitchNetDimensions, tbl_SM_NektonCollection, tbl_SM_NektonEventData, tbl_SM_NektonLengths, and tbl_SM_VegPlotCover.

7. Delete table links

a) Return to the database window. You can open the Linked Tables form again for reference.

b) Delete all linked tables that are no longer needed. These are the tables you identified in Step 1b, above.

8. Delete tables

a) For each table link you removed from the frontend database, you should remove the table from the backend database.

b) Open the Monitoring Data backend file (*MonitoringSM_be.mdb*).

c) Delete all table objects whose link you deleted from the frontend database.

d) Repeat for the Common Lists database, if necessary.

**Compact the Database**

To clean the database and reduce the file size, you will need to use the *Repair and Compact Database* option from *Database Utilities* under the *Tools* menu.

## XII. Appendix I: Data Tables

The monitoring database prototype includes tables in three different database files. Those in the front-end database, the data in the protocol backend file, and those maintained in common for all protocols by the network or region.

**MonitoringSM.mdb**

The majority of tables in this file are linked from the two back-end files, and will be described under the heading of each backend file. The table relationships are inherited and only one relationship graphic is included.

**Table Relationships for Database Template files**
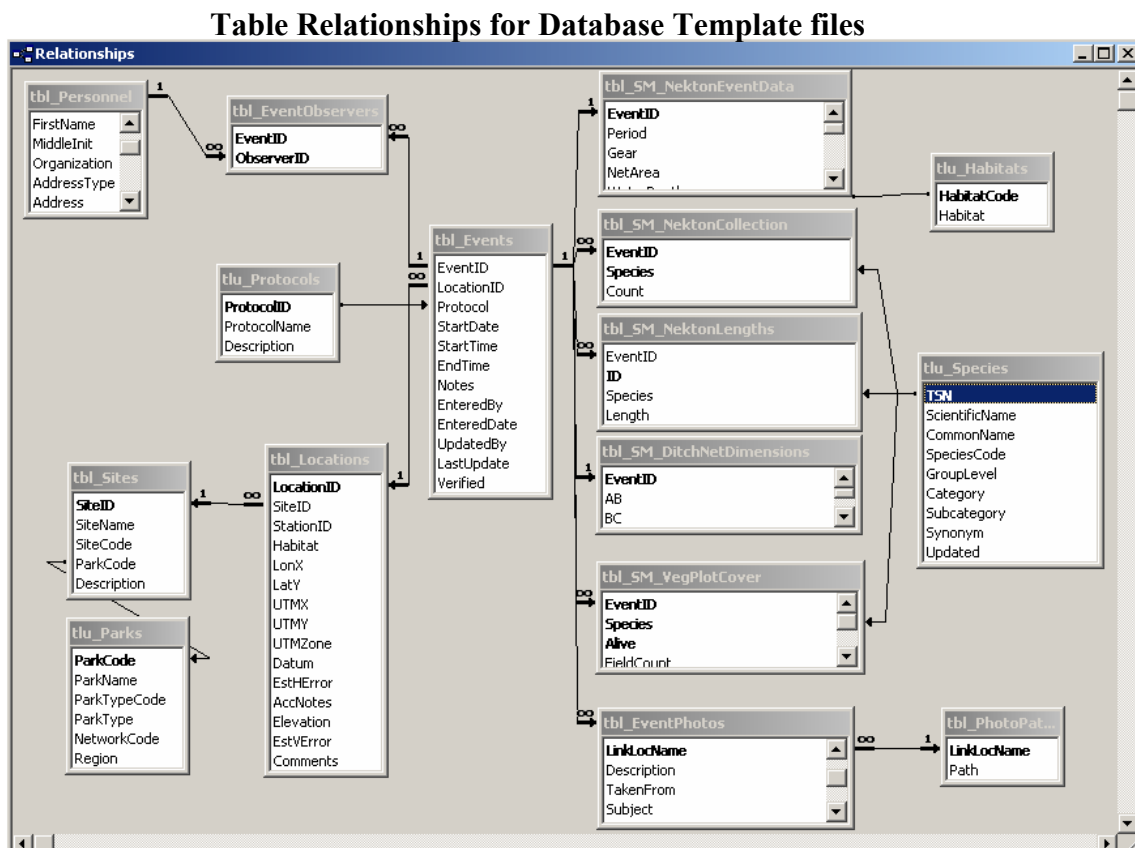


1. Switchboard Items and Switchboard Items NoBlanks
   The Switchboard Items table includes the information for running the Switchboard. It should be edited by the Switchboard Manager, see Section IV: The Main Menu. The Switchboard Items NoBlanks table is an optional table that is easier to use with the Switchboard Manager.

2. tbl_MDT_Conversion

This table stores the settings describing the database and its conversion. Refer to *Step 2: Database Settings* on the *Template Conversion* form.

3.  tbl_MDT_Output

This table stores the picklists for *Summary Reports*, *Export to Excel*, and *Field Data Sheets*. Refer to *Step 5: Printing and Exporting Data* on the *Template Conversion* form.

4.  tbl_MDT_Revisions

This table is the history of revisions to this database file, and is incorporated into the Switchboard, and the About form. It is automatically updated when you change the Database Conversion Settings. If you make other major changes to the database, edit the table with the new revision information.

5.  tbl_MDT_LinkFiles and tbl_MDT_LinkTables

These two tables together determine the location of the backend database files and the tables within them that are to be linked. Refer to *Step 1: Data Table connections* on the *Template Conversion* form.

**MonitoringSM_be.mdb**

All of these tables are linked to the frontend database, but you must make any changes to the table formats and relationships within the sampling backend database.

6.  tbl_EventObservers

These are the observers and recorders associated with sampling events. The format of this table should remain unchanged. The existing data will need to be cleared out.

7.  tbl_EventPhotos

These are photo files associated with sampling events. The format of this table should remain unchanged. The existing data will need to be cleared out.

8.  tbl_Events

These are the location, date and time of sampling events. The format of this table should remain unchanged. The existing data will need to be cleared out. This is the main table that locations and sampling data are linked to. Be sure to check the table relations between this and your new protocol-specific data tables.

9.  tbl_Locations

These are the locations where sampling took place, including the coordinates. The format of this table should remain unchanged. The existing data will need to be cleared out.

10. tbl_Personnel

This is the list of all observers and recorders and their contact information. The format of this table should remain unchanged. The existing data will need to be cleared out. Some sites may be common between monitoring protocols.

11. tbl_PhotoPathNames

These are the folder names and exact directory structures for storing photos. The format of this table should remain unchanged. The existing data will need to be cleared out.

12. tbl_Sites

These are general areas where locations are found. Sites often have names, such as a lake, a marsh, a ridge, etc. The format of this table should remain unchanged. The existing data will need to be cleared out. Some sites may be common between monitoring protocols.

13. tbl_SM_*

These tables contain data and formatting specific to a monitoring protocol. You can review these tables as guides for creating new tables, but each monitoring protocol will require its own set of tables. Review the table relationships between these tables and tbl_Events and tlu_Species. All of these tables will eventually be deleted from your monitoring database, and replaced with new ones. I suggest leaving these in the database until you have completed your adaptation, so you can review how they have been used in the template.

14. tlu_Species

This file is linked from the MonitoringNER_be.mdb database. Make any changes necessary to this table from within the MonitoringNER_be.mdb file, not from this file. It is included in the MonitoringSM_be.mdb to establish table relationships.

**MonitoringNER_be.mdb**

The format and design of data tables in the Northeast Region backend database should not be changed. However, table data should be updated.

15. tlu_DataListsRevisions

This table catalogs changes to this database. When you have completed changes enter the revision and your name in this table.

16. tlu_CloudCover

Add or edit to reflect your own cloud cover classifications. These populate a drop-down list for describing monitoring event conditions.

17. tlu_Directions

This table lists the four main and four intermediate compass directions. These populate a drop-down list for aspect or wind direction, etc. Edit as necessary.

18. tlu_Habitats

Add any new habitat types and their codes. These populate a drop-down list on the locations form.

19. tlu_Networks

This includes the list of all Inventory and Monitoring networks, the acronym for each network and the network number.

20. tlu_Parks

List of all(?) parks, their codes, type of park, and the I&M network they belong to.

21. tlu_Protocols

A new protocol name and ID should be entered into this table for your monitoring database.

22. tlu_RainCode

This table lists the descriptions of no, light or heavy rain. These populate a drop-down list for describing monitoring event conditions. Edit as necessary.

23. tlu_Species

Add any new species referenced in this protocol to this table. Refer to the TSN website for the TSN numbers. Note, if the scientific name given is a synonym and not the accepted species name, use the accepted species name and TSN. Subcategories are used for grouping or subdividing species for purposes of listing or analyzing. Currently each species can only belong to one subcategory. Changing existing subcategories will adversely affect other monitoring databases.

24. tlu_Tides

This is a list for drop-down selection of monitoring events in tidal areas.

25. tlu_WindCode

This table lists the descriptions wind levels. These populate a drop-down list for describing monitoring event conditions. Edit as necessary.

26. tlu_SpeciesType

This table is used as a lookup for the species table, specifying what level of grouping a species record corresponds to: species, genus, family, etc.